SUGAR BEET (*Beta vulgaris*)
Beet curly top; *Beet curly top virus*

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Beet curly top resistance in USDA-ARS Plant Introduction Lines, 2017.

Thirty sugar beet (*Beta vulgaris* L.) Plant Introduction (PI) Lines from the USDA-ARS National Plant Germplasm System (NPGS) and three commercial check cultivars [SV2012RR (susceptible), Detroit Dark Red (susceptible), and HM PM90 (resistant)] were screened for resistance to *Beet curly top virus* (BCTV). The curly top evaluation was conducted at the USDA-ARS North Farm in Kimberly, ID which has Portneuf silt loam soil and had been in barley in 2016. In the spring, the field was plowed and then fertilized (90 lb N and 110 lb P_2O_5/A) and roller harrowed on 11 Apr. Planting at a density of 142,560 seeds/A was done on 15 May. The plots were two rows 10 ft long with 22-in. row spacing and arranged in a randomized complete block design with four replications. The field was sprinkler irrigated, cultivated, and hand weeded as necessary. Plant populations were thinned to approximately 47,500 plants/A on 9 Jun. Plants were inoculated at the four- to six-leaf growth stage on 14 Jun with approximately six viruliferous (contained the following BCTV strains: California/Logan and Severe) beet leafhoppers per plant. The beet leafhoppers were redistributed three times a day during the first two days and then twice a day for five more days by dragging a tarp through the field. The plants were sprayed with Lorsban 4E (1.5 pints/A) on 28 Jun to kill the beet leafhoppers. Plots were rated for foliar symptom development on 6 Jul using a scale of 0 to 9 (0 = healthy and 9 = dead), with the scale treated as a continuous variable (Plant Dis. 90:1539-1544). Data were analyzed in SAS using the general linear models procedure (Proc GLM), and Fisher's protected least significant difference (LSD; $\alpha = 0.05$) was used for mean comparisons.

Curly top symptom development was uniform and no other disease problems were evident in the plot area. The resistant and susceptible checks performed as expected for the visual ratings. Based on the visual rating, there were three lines (entries 2, 7, and 15) that were not significantly different from the resistant check. These three lines will be reevaluated and considered for incorporation into future germplasm. These results and germplasm will be accessible to interested parties through the USDA-ARS, NPGS GRIN database (http://www.ars-grin.gov/npgs/index.html).

Entry[z]	Description	Curly top rating[y]
HM PM90	**Resistant check**	**4.2 o**
7	Ames 2657, SLC 129	4.6 no
15	NSL 93285, A77-17	5.1 m-o
2	PI 518383, F1019	5.1 m-o
6	Ames 2652, SLC 35	5.2 l-n
8	Ames 2659, SLC 131	5.2 l-n
26	PI 372277, 370/71	5.7 k-m
14	NSL 93280, A76-39	5.8 j-m
25	PI 372276, 300/71	6.0 i-m
16	NSL 142007, 044	6.0 h-l
18	NSL 176304, YUGO 2	6.1 h-l
13	NSL 86579, 72/4-41-2-T4	6.2 g-k
12	NSL 80221, RS-1B	6.5 f-k
19	NSL 188575, NS-385 (C1)	6.6 e-k
SV2012RR	**Susceptible check**	**6.6 e-j**
5	PI 546525	6.7 d-i
9	Ames 19159, WIR2293	6.8 d-i
30	PI 381644, Ramonskij 23	6.9 c-i
11	Ames 19168, Ramonskaja 023	6.9 c-i
4	PI 546516	7.0 b-h
1	PI 504233, wild beet	7.2 b-g
28	PI 379099, CRVENO OKRUGLO	7.2 a-f
17	NSL 176303, YUGO 1	7.2 a-f
10	Ames 19164, Bijskaja 032	7.4 a-f
22	PI 176424, PAZI	7.4 a-f
29	PI 381638, MEZHOTNENSK 080	7.4 a-f
23	PI 285594, CRASSA WALCOWATY ZOLTY GRANUM	7.4 a-f
20	NSL 188580, NS-C6 (41×20)	7.4 a-e
27	PI 372278, Mono-IHAR	7.6 a-d
24	PI 285595, CRASSA WALCOWATY ZOLTY PZHR	7.8 a-c
21	PI 175596, IDBBNR 5319	7.8 ab
3	PI 546511	8.0 a
Detroit Dark Red	**Susceptible check**	**8.1 a**
$P > F$[x]		<0.0001
LSD		0.9

[z] Three entries were commercial check cultivars (bold): SV2012RR (susceptible), Detroit Dark Red (susceptible), and HM PM90 (resistant).
[y] Curly top ratings = curly top was rated using a scale of 0 to 9 (0 = healthy and 9 = dead), with disease index (DI) treated as a continuous variable.
[x] $P > F$ was the probability associated with the F value. Within a column, means followed by the same letter did not differ significantly based on Fisher's protected least significant difference (LSD; $\alpha = 0.05$) value.